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Editorial

Editorial: Pregnant patients and open-heart surgery – Decision-making for appropriate timing and surgical strategy

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A case of a pregnant woman with symptomatic atrial myxoma receiving prophylactic use of corticosteroid for preventing fetal immaturity is described in the article by Giammarco et al. [1].

This case report includes several important issues to be considered whenever pregnant patients require open-heart surgeries, such as gestational stage at the time of surgery, safety of cardiopulmonary bypass (CPB) use for the mother and the fetus, treatment strategy, and prognosis of the mother and the fetus depending on gestational stage. We may sometimes have to manage such difficult situations where we have to appropriately decide with limited information and clues whether to save the mother's life first or try to achieve both lives.

There is a basic idea to take into account, according to her gestational stage, in planning treatment strategy for pregnant women with cardiac disorders as follows:

#1 when gestational stage is <28 weeks, priority of life is forwarded to mother's life.
#2 when gestational stage is between 28 and 32 weeks, prognostic evaluation of both lives is uncertain and choice of treatment strategy should be made accordingly.
#3 when gestational stage is >32 weeks, cesarean section/vaginal delivery and open-heart surgeries usually can be recommended to save both lives.

As in this case with gestational stage of 32 weeks, the strategy was naturally deemed to be cesarean section/vaginal delivery and open-heart surgery immediate after the delivery, and thus CPB use would be avoided. In fact, reports on the CPB use for pregnant patients are limited, and among them, John et al. described in 2011 their case series of pregnant patients undergoing open-heart surgeries (for any cardiac diseases) from the Mayo clinic surgical database [2]. In this report, median gestational stage was 25 weeks, including 11 preterm deliveries (6 with less than 33 weeks of gestational stage, and 5 with 33–36 weeks). They reported that neonatal complications occurred only in those of preterm neonates (1 intrauterine growth restriction, 7 respiratory distress syndrome, 8 prolonged hospital stay >7 days). Sepehripour [3] and Yuan [4] summarized in their review articles on evidence regarding the safe use of CPB in pregnant patients and overall prognosis. According to those comprehensive analyses of previous publications, the authors commented that the use of CPB during pregnancy is a high-risk procedure and associated with relatively high fetal and maternal mortality. However, in a particular setting where the use of CPB cannot be avoided to save maternal life, CPB management was by the use of high-flow, high pressure, pulsatile, and normothermia, and close monitoring of fetus and uterus (trans-abdominal/transvaginal ultrasound, etc.) may guide safer control of maternal and fetal status during open-heart surgery. Yates et al. reported their experience with 11 pregnant patients undergoing aortic valve surgery [5], with 0 maternal mortality, and 3 pregnancies resulting in intrauterine demise, even under appropriate maternal and fetal management during the surgery. Management of cardiac myxoma during pregnancy, the incidence of which is low, usually requires meticulous decision-making on the timing of surgery considering the balance between the risk of embolic events and the risk of CPB use. The treatment strategy is optimized according to the circumstance of individual cases, and most of the reports presented favorable maternal and fetal outcomes probably because the surgery would be carried out under detailed assessment and precise planning as a scheduled procedure, and the operation time and CPB duration would be expected to be short and have less adverse influence on the fetal outcome [6,7].

Performing CPB during pregnancy may compromise safety of fetal life, but on the other hand, placing CPB after delivery may also result in a great risk of postpartum bleeding due to systemic heparinization. Hysterectomy is the standard treatment of choice in this setting, and substantial explanation needs to be given to the mothers, especially to nulliparous women.

Efficacy of antenatal corticosteroid (ACS) use has been a widely accepted strategy to lower the risk of complications in preterm neonates. In the report by Sasaki et al. [8], the impact of ACS in very-low-birth-weight infants was evaluated and data from the Japanese neonatal research network database were analyzed, which revealed that ACS treatment is associated with decreases in infant mortality and severe morbidity, and decrease in respiratory distress (RDS) was especially observed in the infants with vaginal delivery. In the review by Falah et al. [9], benefits of ACS in clinical use (reduction in mortality, RDS, intraventricular hemorrhage, etc.) for a wide range of preterm conditions like gestational age and ACS

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pharmacokinetics/pharmacodynamics were described. Even though most of the previous reports on cardiac surgery in pregnancy mainly discussed safer management of CPB and maternal/fetal prognosis, few have commented on active challenges to prevent preterm fetal complications and to control the timing of delivery/the surgery to mothers, including ACS treatment as a part of preparation to decrease feto-neonatal complications. As is generally known, as well as cited in this article or in the reference [1], RDS of the preterm newborns is one of the predominant complications in preterm neonates, and possible prophylactic measurements against such complications need to be taken into account, especially those in the gestational stage around 30 weeks, expecting to obtain the best outcome for both the mother and the infants. Continuous effort to accumulate such experiences is expected.

Conflict of interest

The author declares that there is no conflict of interest.

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